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Study of Waste Water Management and Reuse among RO Users: With Special Reference to Sharadha Nagar, Lucknow, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Reusing this reject (wastewater) can help conserve water resources and reduce environmental impact. RO reject water is often best suited for non-potable applications. To know what is the perception of people towards RO reject water, the researcher conducted a descriptive study on the localities falling under Sharda Nagar of Lucknow. Based on the results obtained from the study, it was revealed that except EWS families, all types of LIG, MIG and HIG families use municipal water supplies as well as individual submersible pumps for water supplying, MIG and HIG households consume excess water for activities like plants, gardens, household washing, washing machines and vehicle washing which can be compensated by RO rejected water. But according to the data

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collected, only 33% of the households use RO. That is, in the houses where RO is installed, 270 litres of water is wasted in a month for the drinking water of one person. According to this, the amount of water wastage also increases depending on the number of the family.

Keywords: Water conservation; RO waste water reuse; RO waste water management; Water communication.

1. INTRODUCTION

For the drinking water of the capital Lucknow, 60 percent water is purified from the Gomti River and the remaining 40 percent water is obtained from the ground through tube wells and hand pumps. However, it is worrying that the river is the lifeline of 60% of the people. The Gomti River is now in danger, as the Gomti River has become highly polluted due to increase in the levels of chloride, nitrate and overall hardness along with discharge of domestic and industrial waste through drains [1]. Therefore, to get clean drinking water households depend on RO (Reverse Osmosis) purification or bottled water. The houses which have good economic condition have started supplying water to their houses through personal submersible pumps. Water is a natural resource, and it supports to keep balance of nature. Both blessings and curses are applied to scientific discoveries. Scientists developed RO technology to provide pure and clean water, but its misuse is causing a water disaster [2]. Only 0.5% of fresh water on Earth is drinkable, but climate change is threatening that supply. Water scarcity will put a burden on the food supply [3]. Lack of access to clean water is a major health concern in poor nations, where more than 2 billion people live without basic sanitation and millions die each year from waterborne infections [4].

People are wasting more drinking water than they use. This is happening when water shortage is a global issue and there is a lack of conservation for available water.

Increasing temperatures and increasing water demand are putting more pressure, in such a situation there is a need to make people aware of water conservation and water reuse because life cannot be imagined without water. The problem of water pollution in urban areas is getting worse. Water sources have been polluted by the expansion of industrialization and urbanization. Pollutants include chemicals, trash, bacteria, and parasites [5]. Contaminated water is generated during many human activities, which get into the water source through various means, these sources are considered to be a widespread cause of water pollution [6]. This is dangerous to health. 60% of people in the world are far from access to clean drinking water and results transmission of water and vector-borne diseases such as typhoid fever, cholera, malaria and yellow fever, so it is important to know your risk and protect your water sources.

This is the primary reason why people began relying on RO water purifiers to obtain clean water for their health. RO manufacturers have also shown in their advertisements how their product prevents people from contracting infections via water and provides clean water. The global home water filtration unit market was valued at USD 10.85 billion in 2021 and is expected to expand at a compound annual growth rate (CAGR) of 10.5% from 2022 to 2030 [7].

In 1949, the University of California studied the effectiveness of semipermeable membranes (RO membranes) in the desalination (removal of salt) of seawater. Researchers successfully produced fresh water from brackish seawater in the mid-1950s [8]. According to the World Health Organization (WHO) report, when R.O purifiers purify water, it removes good minerals along with bad minerals. RO system off course removes water impurities. But they also remove 92-99% of beneficial calcium and magnesium. This signifies that the minerals and vitamins obtained in meals are being urinated away. Less minerals taken combined with more minerals expelled results in substantial negative side effects and major health problems. As a result of changing lifestyles, particularly in urban regions, the business has gained enormous traction in recent years. Because of the shortage of drinking water and contamination, firms such as Eureka Forbes, Aqua guard, and other RO producers have emerged.

A RO purifier wastes approximately 3 litres of water for every 1 litre of filtered water. This means that just 25% of the water is cleaned and 75% of the water is wasted [9]. This means that

with the growing market of RO, water wastage is expected to increase, which will lead to a bigger water crisis in the future. To combat this problem human should start sustain water use and focus on waste water management. The waste water from the RO is used for a variety of different daily tasks such as washing clothing, cleaning kitchenware and the house, and watering plants and gardens.

1.1 Background of Study

Reusing wastewater is an important part of both wastewater management and water resource management. Agriculture expert Devinder Sharma says that in Ludhiana City, 15 million litres of water are wasted every day by RO water purifiers. This means that 450 million litres of good quality water are wasted every month in Ludhiana City alone [10] In this manner, 450 million litres of water per month can be reused from waste water management, quenching the thirst of people in locations where there is an urgent water shortage.

There are some remarkable cases for inspiring water conservation more than 100 women of Chhatarpur Angrotha village of Madhya Pradesh, along with a social worker organization, cut a 107-meter-long mountain in 18 months to make way for water. Due to this water has started being conserved in the village [11].

Similarly, Kamegowda, who lives in Mandavali, Karnataka, is a farmer by profession. After the scarcity of water, he decided to single-handedly dig a pond for the people of his village and got involved in this work. In today's time, he has dug 16 pounds so far [12]. He was called "Man of Pond".

In his article *Planning a Wastewater Reuse Program in Nigeria*, [13] writes wastewater reuse for both potable and non-potable uses needs to be brought to the forefront of global discussion in order to support sustainable and effective wastewater management. A crucial element of the success of wastewater reuse projects has been recognized as community support for the use of recycled water. Additionally, a lot of wastewater treatment plans in developing nations fail because they merely copy western treatment methods without taking the local culture, geography, and climate into account.

A study in Peru known as The Lima case study revealed that Peru's Ministry of Housing, Construction, and Sanitation has established a set of policy recommendations to encourage the reuse of wastewater for urban irrigation throughout the country. They are expanding on existing small-scale private wastewater treatment projects in the Lima area, with the aim of increasing wastewater treatment reuse at the city and national levels to make it a viable economic choice. This will be especially crucial along the Peruvian coast, where fresh water resources are scarce [14].

Bixio et al. [15] present a report to examine European water reuse methods and provides a road map of water reclamation technology and applications. The results are based on a traditional literature review, an in-depth survey of a significant number of European water reuse projects, and the findings of a dedicated international workshop. Individuals, local communities, and businesses, as well as centralized laws and regulations, are critical to the success of an integrated water management policy. United Nations organization UNESCO, the drinking water crisis in India will increase by 2025, and mentioned that due to the melting of glaciers, the flow of major Himalayan rivers like the Indus, Ganga, and Brahmaputra will decrease [16].

Wu et al., [17] Statements in his research many countries throughout the world have widely utilized wastewater reuse for agriculture. It is mostly used for agricultural and landscape irrigation. Washing machine and kitchen sink waste has also been utilised to irrigate grass above and below ground, respectively. Most countries are working to improve their wastewater treatment systems in order to produce high-quality irrigation effluent.

1.2 Significance of the Study

The present study is based on household water conservation characteristics, water consumption, water reuse and water saving habits. This study is important in today's context because every person is facing water crisis. Many countries around the world are working on water conservation and reuse of waste water. This research will help in eliminating drinking water crisis in future. Also, by reusing waste water at domestic level, water sources can be conserved for a long time.

1.3 Research Objectives

1. 1. To know the water source of the houses using RO.

2. Analyzing RO customers' utilization of RO wastewater.
3. To study the houses using RO.

1.4 Research Questions

1. What are the water sources in the homes of RO users?
2. Do RO users reuse RO waste water?
3. In which houses RO waste water is reused?
4. How can O waste water be reused?

2. METHODOLOGY

Descriptive research has been adopted to achieve the objectives of the research paper. For which the researcher made a survey questionnaire and collected data related to RO waste water management and reuse from RO users from the localities under Sharda Nagar of Lucknow city. The researcher has chosen Sharda Nagar of Lucknow city, the capital of Uttar Pradesh state of India as the study area for this research paper. There are a total of 17 localities in Sharda Nagar, whose names are as follows –

The researcher selected five localities using random sampling from Table1.names are as follows

List 1. Selected five study area localities

Srl. No.	Selected localities
1	RAJNI KHAND
2	RATNAKAR KHAND
3	SALEH NAGAR
4	SOUTH CITY
5	RATNAKAR KHAND

From the selected localities the researcher selected 20 such respondents from each locality on the basis of purposive sampling who use RO for water treatment.

2.1 About Research Area

The study was conducted on the residents of Sharda Nagar, Lucknow on the topic 'A Study of Wastewater Management and Reuse among RO Users: With Special Reference to Sharda Nagar, Lucknow'. In the study, RO using houses of Sharda Nagar have been considered as units. At present, Lucknow is the capital of India's most populous state Uttar Pradesh. It is also called the city of nawabs. In ancient times, Lucknow was known as Laxmanpur. Situated on the banks of river Gomti, this city is known for its rich culture and ancient heritage.

According to the Lucknow Municipal Corporation website, there are a total of 110 wards in the city of Lucknow. In which there are a total of 1077 localities [18]. This study work is focused on Sharad Nagar in Lucknow. There are 17 localities in all. According to the methodology, 5 of the 17 localities were chosen for the study.

2.2 Finding and Analyzing

As per the data shown in Table 2, 20 households are included as respondents from each locality. But due to error in the one household data of the 20 households selected from Ratan Khand area, total of 19 households from this locality included as respondents.

According to the statistics in Table 3, the age range of 18 to 28 has the highest proportion of respondents. The second number is between the ages of 29 and 39 and 40 to 50 years old respondents' number are 14.

Table 1. Name of localities, Shardha Nagar, Lucknow

Srl. No.	Name of localities	Srl. No.	Name of localities
1	BHADRUKH	**10**	RAJNI KHAND
2	USARI	**11**	SANIK NAGAR
3	SALEH NAGAR	**12**	SENANI VIHAR
4	FIRANGI KHEDA	**13**	SOUTH CITY
5	DEVI KHERA	**14**	ELDECO-II
6	SARPOT GANJ	**15**	PIPROWLI
7	ELDECO-I	**16**	SHEETAL KHERA
8	RUCHI KHAND	**17**	RATNAKAR KHAND
9	RASHMI KHAND		

Table 2. Respondents according localities

	Frequency	Percent	Valid Percent	Cumulative Percent
Rajni khand	20	20.2	20.2	20.2
Ratan khand	19	19.2	19.2	39.4
Ratnakar khand	20	20.2	20.2	59.6
Saleh nagar	20	20.2	20.2	79.8
South city	20	20.2	20.2	100.0
Total	99	100.0	100.0	

Table 3. Age groups of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
18-28	47	47.5	47.5	47.5
29-39	38	38.4	38.4	85.9
40-50	14	14.1	14.1	100.0
Total	99	100.0	100.0	

Table 4. Type of household of the respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
EWS	26	26.3	26.3	26.3
HIG	34	34.3	34.3	60.6
LIG	17	17.2	17.2	77.8
MIG	22	22.2	22.2	100.0
Total	99	100.0	100.0	

EWS, LIG, MIG, and HIG households were chosen as responders, and their information is mention in Table 4.

- EWS – Economically Weaker Section
- LIG – Low Income Group
- MIG – Middle Income Group
- HIG – Highest Income Group

Question 1. What are the water sources in the homes of RO users?

Fig. 1 shows the data gathered from respondents in response to question1. In which there are two water sources for water supply in the selected respondents' homes. Municipal water supply and personal submersible. Municipal water supplies are available to all types of residences, although HIG, LIG and MIG household have personal submersible for water supply as the above Fig. shows**,** which contains the number of different types of houses and their water sources.

Both household water consumption and water sources were evaluated in Fig. 2. All types of households use water for drinking, bathing, cooking, washing clothes and sanitation. Apart from this, the requirement of water depends on the income, education, job, etc. of the families. In economically stronger families, machines are used for gardening, cleaning vehicles, watering trees and washing clothes and utensils, which consume more water.

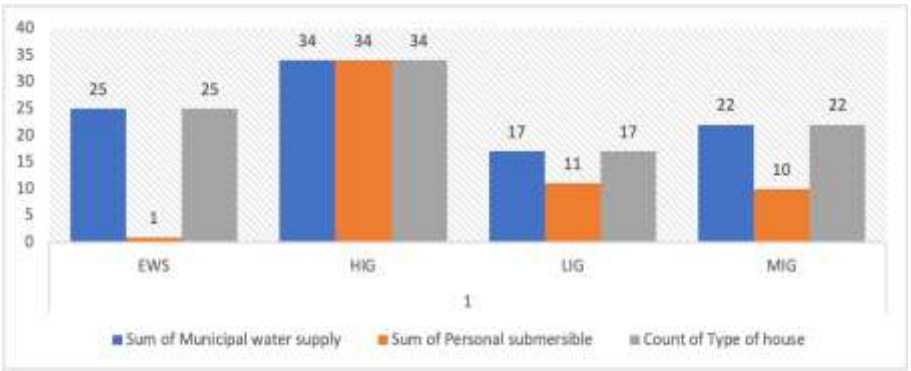

Fig. 1. Types of houses and their water sources (**Data in Frequency)**

Fig. 2. Water consumption of households

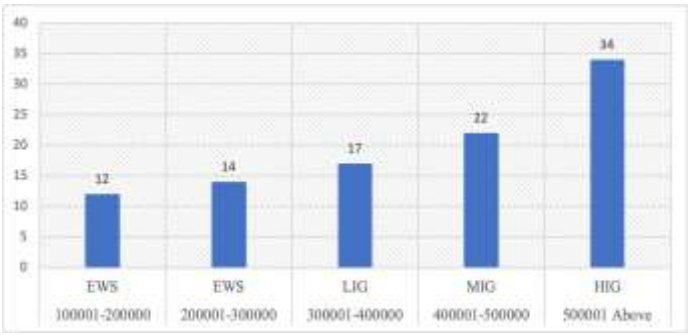

Fig. 3. Households Income

Fig. 3 shows the different types of households on the basis of their income. Families with an annual income of Rs 1-3 lakh live in EWS houses. Those with an annual income of Rs 3-4 lakh live in LIG and those with an annual income of Rs 4-5 lakh live in MIG houses. While people with an annual income of Rs 5 lakh or more live in HIG houses.

Details of additional water consumption excluding drinking for cooking, bathing, and laundry are presented in Fig. 4. In households with EWS, 46% of the surplus water is used for washing automobiles, 23% for watering plants and 8% for watering gardens. Although such residences lack a garden, a small garden has been created in the government vacant land in front of the roadside house. In such a house, 5-6 flower plants are planted in one pot. For which very little water is required.

In HIG households, 85% of the surplus water is used for watering plants, 24% for washing vehicles and 21% for watering gardens. In LIG households, **65%** of the surplus water is for watering plants and **24%** for washing vehicles. Households of this category use the empty space in front of their houses as parking. Due to this, there is no garden in these houses but the number of potted plants is more. In MIG households, 73% of the surplus water is used for plants, 23% for washing vehicles and only 23% for watering the garden.

Question 2. Do RO users reuse RO waste water?

According to the information provided in response to question 2, only 33% of RO-using households use RO waste water. Whereas 66% of households discard the RO water that comes out.

Question 3. In which houses RO waste water is reused?

The decision to reuse RO waste water is dependent on the type of house. According to the data shown in Fig. 6, just 38% EWS household use waste water, while 62% do not. Similarly, just 29% of LIG households utilize waste water, while 71% do not. 55% of MIG houses have RO waste water reuse while 45% of houses do not. Wherein 82% HIG houses do not use RO waste water, only 18% houses reuse RO waste water.

Question 4. How does RO waste water be reused?

Based on the data collected for question 4, it is concluded that multiple households handle and

utilize RO waste water in different ways. But the behaviour of the householders towards the waste water coming out of RO devices used at home is shown in the Fig.7.

According to statistics, in 50% of the houses, the waste water coming out of the RO machine goes into the kitchen sink, while in 28% of the houses it is directly connected to the drainage pipeline, resulting in a total of 78% of the households wasting the RO (Rejected water) waste water.

While in 22% of residences, RO waste water is collected in a bucket or large bottle and reused.

Based on the analysis of Fig. 8, RO waste water is mostly used in coolers. This may also be because this research was done in summer time. In the same sequence, RO waste water is used for washing clothes. After this, the water coming out of RO is used for cleaning vehicles, house etc. The number of which is seen in the picture.

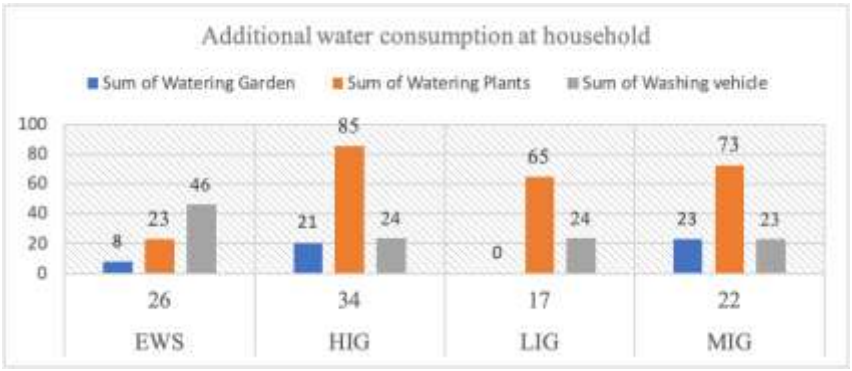

Fig. 4. Additional water consumption at household (Multipole Respondent)

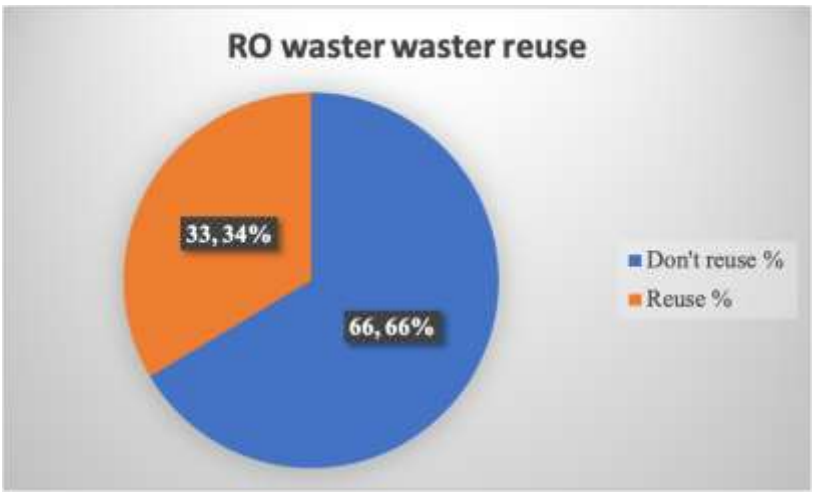

Fig. 5. RO waste water reuse response

Fig. 6. waste water reuse among RO users

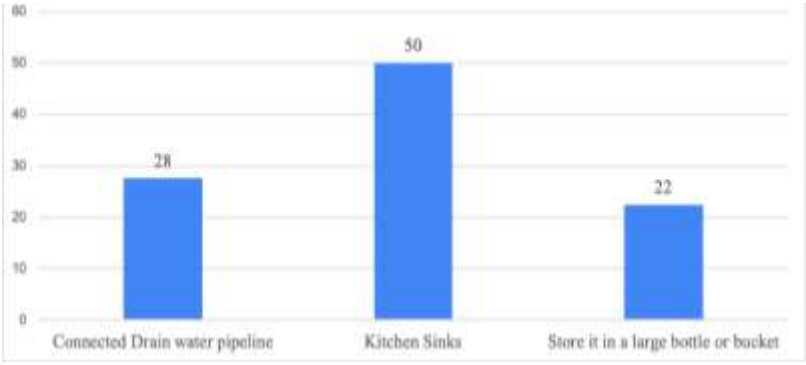

Fig.7. Household behavior towards RO waste water

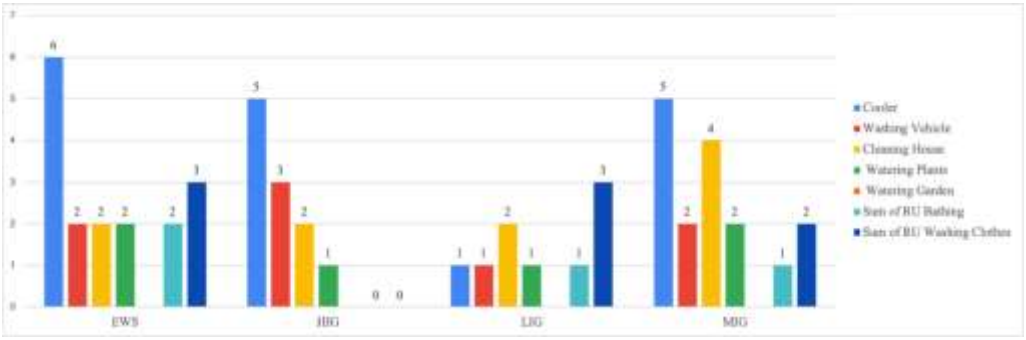

Fig. 8. Reusing RO waste water in different types of Households (Multi response) / (RU means Reuse)

3. RESULTS AND DISCUSSION

There is no doubt that tremendous progress has been made in terms of access to safe drinking water. However, the demand for water has risen. Rapid modernization and the exploitation of uncontrollable natural resources provide a significant problem. Water is also one of them. At the moment, the way water management has been neglected and unregulated exploitation has resulted in climate change. In this background, the United Nations reported in a statement that drought is a hidden global disaster that threatens to become the "next pandemic" if countries do not take immediate action on water and land management as well as addressing the climate emergency [19].

Water crisis is a global issue every country is facing this issue either in the form of drought or excess rainfall and floods. One in every three persons in the world today lacks access to sanitation. Every day, 700 children under the age 5 die from diseases caused by contaminated water and sanitation [20]. Based on the information presented above, it is evident that there is a need for water management and conservation on a drop-by-drop basis [20-23].

Whereas millions of litres of water are wasted in residences utilizing RO, people die due to a shortage of even a single drop. The amount of water released during the (reverse osmosis) RO process is concerned about those who utilize it, because filtering technology wastes over 70% of the water used to clean just one litre of water. This RO waste water can be used for various domestic purposes such as washing vehicles, cleaning toilets, watering plants, washing clothes, etc [20,24-27]. Daily water requirement of each household for purposes such as cleaning, drinking, cooking, washing clothes and bathing. Along with this, if there are plants, pots, garden or vehicles like bike, car in the house, then water is also required to clean them. For all these works, the pressure of water supply falls on the water source [28,29].

The minimum amount of water recommended by the United Nations for each person is 50 litres per person. According to the data in Fig. 1, the municipality provides water to practically every family in urban areas. Individual submersibles give water to HIG, MIG, and LIG homes.

Table 5. Family members according age groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2 member	14	14.1	14.1	14.1
	3-4 member	56	56.6	56.6	70.7
	5-6 member	29	29.3	29.3	100.0
	Total	99	100.0	100.0	

It is concluded that larger households should be more vulnerable to water preservation. Because RO wastes 3 litres of water for 1 litre of water treatment. While the World Health Organization recommends 3 litres drinking water for a person each day. In this case, a person requires 90 litres of drinking water per month, and RO wastes 270 litres for rectification if this rejected water is not reused in RO-using homes. Thus, in homes using RO, 270 litres of water per person is wasted in a month. And the amount of water wasted increases according to the number of families.

4. CONCLUSION

On the basis of analysis and research review of the above data, it is concluded that only 33% of the houses using RO in Sharda Nagar locality of Lucknow are sensitive to water conservation. On the other hand, higher income and more educated families pay little attention to this, while their homes have more options to manage and use RO wastewater. RO waste water in HIG and MIG dwellings can be utilized for washing clothing, washing vehicles, cleaning houses, and watering plants and gardens, assuring the long-term sustainability of the water source. But according to the statistics, disappointing results have been found in these houses towards water conservation. Water usage is also high in MIG and LIG Residences as a result of large family sizes and modern living. However, they also generate a significant amount of reject water, which is typically discharged as wastewater.

Reusing this reject (wastewater) can help conserve water resources and reduce environmental impact. RO reject water is often best suited for non-potable applications. Common uses include irrigation, cooling water for industrial processes, and certain types of industrial cleaning. Wastewater reuse, in general, has several environmental benefits, including reduced demand for freshwater sources, decreased discharge of pollutants into natural water bodies, and lower energy consumption compared to desalinating new water sources.

5. RECOMMENDATION AND SUGGES-TIONS

- Reusing RO reject water can lead to water conservation, cost savings, reduced environmental impact, and improved overall water management practices. It's a sustainable approach that benefits both organizations and the environment by making more efficient use of water resources and reducing the negative consequences associated with reject water disposal.
- Engaging with the local community and demonstrating responsible water management practices, including reuse of reject water, can garner support and goodwill from residents and stakeholders.
- RO manufacturing companies should encourage people to reuse RO rejected water in advertisements.
- People should be made aware that RO should not be used if it is not necessary.
- Financially prosperous families should train their domestic servants to use RO rejected water.

DATA AVAILABILITY

During this study, analysis of the data of the residents of the locality under Sharda Nagar of Lucknow city, such as type of houses, employment, age, annual income, which is available in the research paper, has been analysed. The names and emails etc. of the respondents cannot be published publicly. Data may be made available upon reasonable request and with permission from the respective respondents.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Kumar D, Verma A, Dhusia N, More N. (n.d.). Water Quality Assessment of River Gomti in Lucknow; 2013.

2. Muthu V. Dangers of Reverse Osmosis (RO) water; 2020, August 9.
Retrieved from Times of India: https://timesofindia.indiatimes.com/readersblog/ezhil/dangers-of-reverse-osmosis-ro-water-24279/
3. Wake up to the looming water crisis, report warns; 2021, October 5
Retrieved from World Metrological Orginization:https://public.wmo.int/en/media/press-release/wake-looming-water-crisis-report-warns
4. SDG Report 2022; 2023, April 12.
Retrieved from United Nations Statistics Division Development Data and Outreach Branch:https://unstats.un.org/sdgs/report/2022/Goal-06/
5. World Water Quality Alliance (WWQA) – a partnership effort; 2023;4:12.
Retrieved from UN environment: https://www.unep.org/explore-topics/water/what-we-do/improving-and-assessing-world-water-quality-partnership-effort?gclid=CjwKCAjwqZSlBhBwEiwAfoZUIIhuSMdglZRDg_9TKG8GocKQwFQB-XouNMf2BFZiymrjuhu2PdtIaRoCG3YQAvD_BwE
6. Water Pollution; 2023, April 10.
Retrieved from WWF:https://wwf.panda.org/discover/knowledge_hub/teacher_resources/webfieldtrips/water_pollution/
7. The Economic Times; 2023, April 29.
Retrieved from 9 best-selling RO Water Purifiers in India (2023): https://economictimes.indiatimes.com/top-trending-products/kitchen-dining/water-purifiers/best-selling-ro-water-purifiers-in-india/articleshow/99872672.cms
8. History of Reverse Osmosis; 2023, May 10.
Retrieved from Water filter Answers: https://waterfilteranswers.com/brief-history-reverse-osmosis-filtration-process/
9. 2023, june 10.
Retrieved from Pure It: https://www.pureitwater.com/blog/post/worried-about-the-wastage-of-water-while-using-an-ro-meet-the-ro-water-purifiers-of-the-hour#:~:text=For%20every%201%20liter%20of,of%20the%20water%20is%20wasted.
10. Singh, M. Ludhiyana News; 2023;04:2.
Retrieved from Times of India: https://timesofindia.indiatimes.com/city/ludhiana/water-scarcity-city-wastes-786-m-litres-daily/articleshow/4650203.cms
11. Sen, S; 2023, June 5.
Retrieved from The Logical India : https://thelogicalindian.com/uplifting/mp-village-women-24055?infinitescroll=1
12. 2023, April 10.
Retrieved from The Economic Times: https://economictimes.indiatimes.com/news/new-updates/pond-man-kamegowda-who-earned-praise-of-pm-for-water-conservation-dies/articleshow/94918149.cms
13. Adewumi JR, Oguntuase AM. Planning of Wastewater Reuse Programme in Nigeria; 2023.
14. The Lima case study; 2011.
Retrieved from LOFTUS 2011 Lima Peru. Reuse of Treated Wastewater for Urban Greening and Agriculture in Lima.pdf 1 : https://sswm.info/sites/default/files/reference_attachments/LOFTUS%202011%20Lima%20Peru.%20Reuse%20of%20Treated%20Wastewater%20for%20Urban%20Greening%20and%20Agriculture%20in%20Lima.pdf
15. Bixio D, Thoeye C, De Koning J, Joksimovic D, Savic D, Wintgens T, Melin T. Wastewater reuse in Europe. Desalination. 2006;187(1–3):89–101.
Available:https://doi.org/10.1016/j.desal.2005.04.070
16. Kumar v. Jalvayu. 2023;6:10
Retrieved from Jan Chauk: https://janchowk.com/jalvayu/future-of-common-life-amid-water-crisis/
17. Wu TY, Mohammad AW, Lim SL, Lim PN, Hay JXW. Recent Advances in the Reuse of Wastewaters for Promoting Sustainable Development. In Sharma SK Sanghi R. (Eds.), Wastewater Reuse and Management (pp.). Springer Netherlands. 2013;47–103.
Available:https://doi.org/10.1007/978-94-007-4942-9_3
18. 2023, June 10.
Retrieved from Lucknow Nagar Nigam: https://lmc.up.nic.in/pdf/ward_suchna_english.pdf
19. Harvey F. Climate crisis; 2021, june 18.
Retrieved from The Guardian: https://www.theguardian.com/environment/2021/jun/17/the-next-pandemic-drought-is-a-hidden-global-crisis-un-says
20. Meetings Coverage and Press Releases; 2021, November 16
Retrieved from United Nations: https://press.un.org/en/2021/sgsm21024.doc.htm

21. Vyas P, Solomon SG. Knowledge regarding reverse osmosis (R.O) waste water utilization among general public in urban areas. Southeast Asian Journal of Case Report and Review. 2023;10(1):13–19.
Availoable:https://doi.org/10.18231/j.sajcrr.2023.003
22. Works Cited. 2013, April 28.
Retrieved from UNESCO: https://www.unesco.org/en/articles/imminent-risk-global-water-crisis-warns-un-world-water-development-report-2023#:~:text=Globally%2C%202%20billion%20people%20(26,Water%20Conference%20in%20New%20York.
23. Proposal for the proclamation by the united nations of 2025 as an international year of quantum science and technologysummary. Paris: Unesco; 14 April 2023.
Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000385142
24. 2023, June 10
Retrieved from The Print: https://theprint.in/india/tap-water-quality-best-in-mumbai-most-unsafe-in-delhi-finds-bureau-of-indian-standards/322188/
25. Sukumar Pal, PB. 2018. Human rights and social JUSTICE . New Delhi: New Delhi Publishers.
26. Drinking Water. Retrieved from centers for disease control and prevention: 2023, June 01.
Available:https://www.cdc.gov/parasites/amebiasis/general-info.html
27. 2023, June 19;
Retrieved from NDTV:https://www.ndtv.com/world-news/himalayan-glaciers-melting-65-faster-than-previous-decade-study-4135528
28. Sibi, A. Global warming could shrink himalayan glaciers by Up to 80%, According to New Report. BENGALURU: Timd magazine; JUNE 19, 2023.
29. Gupta, A. Campus Voice; 2021;10:27
Retrieved from The Print: https://theprint.in/campus-voice/9-1-crore-indians-dont-have-basic-water-supply-but-india-isnt-paying-attention/756384/

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